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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,546	03/26/2004	Masahiro Satoh	Q80585	6135

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
COHEN, AMY R	

ART UNIT	PAPER NUMBER
2859	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/809,546	SATOH ET AL.
	Examiner	Art Unit
	Amy R. Cohen	2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 rejected under 35 U.S.C. 102(e) as being anticipated by Smith et al. (U. S. Patent No. 6,543,146).

Regarding claims 1-7: Smith et al. teaches a directional measuring device that measures a direction of a body of the directional measuring device in a three-dimensional space including an X-axis indicating magnetic north on a horizontal plane, a Y-axis orthogonal to the X-axis in the horizontal plane, and a Z-axis orthogonal to the horizontal plane, assuming that the body points towards an x-axis, comprising; a tilt angle detector (514) that detects an x-axis tilt angle that is an angle between the x-axis and the horizontal plane and a y-axis tilt angle (514) that is an angle between a y-axis, which is orthogonal to the x-axis, and the horizontal plane; a converter that rotates (L), based on the x-axis tilt angle and the y-axis tilt angle, the x-axis and the y-axis to obtain a rotated-x-axis and a rotated-y-axis that are in the horizontal plane; a primary azimuth calculator that calculates a primary azimuth that is an angle between the X-axis and the rotated-x-axis (522); and an azimuth error angle extracting unit (524) that extracts, based on the x-axis tilt angle, the y-axis tilt angle, and the primary azimuth, an azimuth error angle included in the primary azimuth due to rotation by the converter (Figs. 5-7 and Col 8, lines 31-67).

Smith et al. teaches the directional measuring device wherein the azimuth error angle includes a first error angle by a predetermined amount based on a direction and a magnitude of each of the x-axis tilt angle and the y-axis tilt angle (Figs. 1-5 and Col 8, lines 31-67).

Smith et al. teaches the directional measuring device wherein the azimuth error angle includes a second error angle that represents a variation by which the first error angle varies according to a value of the primary azimuth (Figs. 6A, 6B and Col 10, lines 1-66).

Smith et al. teaches he directional measuring device comprising a secondary azimuth calculator that calculates, based on the primary azimuth and the azimuth error angle, a secondary azimuth that represents a direction of the body (Figs. 6A, 6B and Col 10, lines 1-27).

Smith et al. teaches the directional measuring device comprising a declination input unit that receives a declination at a present position of the body, wherein the second azimuth calculator calculates the second azimuth from the declination (Figs. 6A, 6B and Col 10, lines 1-27).

Smith et al. teaches the directional measuring device comprising: a first-axis geomagnetic force detector (502, 504) that detects a geomagnetic force along a first axis from among the x-axis, the y-axis, and the z-axis, which is orthogonal to both the x-axis and the y-axis; a second-axis geomagnetic force detector (502, 504) that detects a geomagnetic force along a second axis other than the first axis from among the x-axis, the y-axis, and the z-axis; a total geomagnetic force input unit (520) that receives a total geomagnetic force at a present position of the body, wherein the total geomagnetic force is a vector addition of geomagnetic forces along the X-axis, the Y-axis, and the Z-axis (Col 7, lines 19-67); and a geomagnetic force calculator that calculates a geomagnetic force along a third axis other than the first axis and the second axis, from among

the x-axis, the y-axis, and the z-axis based on the total geomagnetic force and the geomagnetic forces along the first axis and the second axis, wherein the primary azimuth calculator calculates the primary azimuth based on the geomagnetic forces along the first axis to the third axis (Figs. 3-5 and Col 7, lines 19-67).

Regarding claims 7-12: Smith et al. teaches a directional measuring method of measuring a direction of a body of the directional measuring device in a three-dimensional space including an X-axis indicating magnetic north on a horizontal plane, a Y-axis orthogonal to the X-axis in the horizontal plane, and a Z-axis orthogonal to the horizontal plane, assuming that the body points towards an x-axis, comprising: detecting an x-axis tilt angle that is an angle between the x-axis and the horizontal plane and a y-axis tilt angle that is an angle between a y-axis, which is orthogonal to the x-axis, and the horizontal plane (Col 7, lines 19-67); rotating, based on the x-axis tilt angle and the y-axis tilt angle, the x-axis and the y-axis to obtain a rotated-x-axis and a rotated-y-axis that are in the horizontal plane; calculating a primary azimuth (522) that is an angle between the X-axis and the rotated-x-axis (Col 7, lines 19-67); and extracting, based on the x-axis tilt angle, the y-axis tilt angle, and the primary azimuth, an azimuth error angle (524) included in the primary azimuth due to rotation by the converter (Figs. 1-5 and Col 8, lines 31-67).

Smith et al. teaches the directional measuring method wherein the azimuth error angle includes a first error angle by a predetermined amount based on a direction and a magnitude of each of the x-axis tilt angle and the y-axis tilt angle (Col 8, lines 31-67).

Smith et al. teaches the directional measuring method wherein the azimuth error angle includes a second error angle (calibration 650) that represents a variation by which the first error angle varies according to a value of the primary azimuth (Figs. 6A, 6B).

Smith et al. teaches the directional measuring method comprising: calculating, based on the primary azimuth and the azimuth error angle, a secondary azimuth that represents a direction of the body (Figs. 6A, 6B).

Smith et al. teaches the directional measuring method comprising receiving a declination at a present position of the body, wherein the calculating the secondary azimuth includes calculating the second azimuth from on the declination (Figs. 6A, 6B).

Smith et al. teaches the directional measuring method comprising: detecting a geomagnetic force (502, 504) along a first axis from among the x-axis, the y-axis, and the z-axis, which is orthogonal to both the x-axis and the y-axis; detecting a geomagnetic force along a second axis (502, 504) other than the first axis from among the x-axis, the y-axis, and the z-axis; receiving a total geomagnetic force at a present position of the body, wherein the total geomagnetic force is a vector addition of geomagnetic forces along the X-axis, the Y-axis, and the Z-axis (Col 8, lines 1-30); and calculating a geomagnetic force along a third axis other than the first axis and the second axis, from among the x-axis, the y-axis, and the z-axis based on the total geomagnetic force and the geomagnetic forces along the first axis and the second axis, wherein the calculating the primary azimuth includes calculating the primary azimuth based on the geomagnetic forces along the first axis to the third axis (Figs. 1-5 and Col 8, lines 1-67).

Regarding claim 13: Smith et al. teaches a computer program that realizes on a computer a directional measuring method of measuring a direction of a body of the directional measuring

device in a three-dimensional space including an X-axis indicating magnetic north on a horizontal plane, a Y-axis orthogonal to the X-axis in the horizontal plane, and a Z-axis orthogonal to the horizontal plane, assuming that the body points towards an x-axis, the computer program making the computer execute: detecting an x-axis tilt angle that is an angle between the x-axis and the horizontal plane and a y-axis tilt angle that is an angle between a y-axis, which is orthogonal to the x-axis, and the horizontal plane; rotating, based on the x-axis tilt angle and the y-axis tilt angle, the x-axis and the y-axis to obtain a rotated-x-axis and a rotated-y-axis that are in the horizontal plane; calculating a primary azimuth that is an angle between the X-axis and the rotated-x-axis; and extracting, based on the x-axis tilt angle, the y-axis tilt angle, and the primary azimuth, an azimuth error angle included in the primary azimuth due to rotation by the converter (Figs. 3-7, and Col 2, lines 10-43, all of the operations performed by the device are performed by a computer program).

Response to Arguments

3. Applicant's arguments filed June 6, 2005 have been fully considered but they are not persuasive.

Regarding Applicant's arguments that the present invention extracts an azimuth error angle due to rotation by the converter, whereas Smith compensates for errors due to magnetic field perturbation, Examiner acknowledges that Smith does compensate for errors due to magnetic field perturbation. However, Smith also extracts an azimuth error angle due to rotation by the converter since Smith uses the tilt sensor, 514, in order to calculate the converter L

(Smith, Col 2, lines 21-35, Col 3, lines 56-60, Col 4, lines 9-29, Col 8, lines 17-67, Col 9, lines 4-24, Col 16, lines 2-17).

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amy R. Cohen whose telephone number is (571) 272-2238. The examiner can normally be reached on 8 am - 5 pm, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F. Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ARC
August 17, 2005

Christopher Fulton
Primary Examiner
Tech Center 2800